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Abstract

This study focuses on the effects of social and cultural capital on 15-year-old scholars' achievements in financial literacy. We use data from 13 OECD (Organization for Economic Cooperation and Development) countries participating in the 2012 Programme for International Student Assessment (PISA 2012). The hierarchical structure of the PISA data allow us to examine the influence of the socio-cultural capital components at the individual and school level. For that purpose, different hierarchical liner models are estimated with the aim to observe the differences among students in financial literacy performance according to individual and school characteristics, highlighting social and cultural capital issues. Therefore, multilevel models are adopted to understand how adolescents' academic performance is influenced by family background and school context. In general, our results show that both social and cultural capital at the individual and school level affect positively to student's financial literacy. In more detail, results indicate that families with high levels of cultural capital and parents who encourage discussion of social issues have a clear positive influence on adolescents' financial literacy. The results also show a positive effect

on the financial performance of adolescents attending schools that offer music, drama, volunteering programmes and maths competitions, combined with good student-teacher relationships and good engagement of parents in school activities. The study here proposed confirms that young scholars should not be considered as a homogeneous group by policy makers designing instruments to foster and improve children's financial literacy. In this sense, educational reforms must be carefully considered. Although our focus is on a narrow set of cognitive variables such as financial literacy, it is stress the need for more research to complement this work. We need to consider socio-emotional outcome variables to enable a more rounded study of adolescents' academic performance, including their attitudes to school and to learning, among others.

Keywords: Social Capital; Cultural Capital; Financial Literacy; Family Background; School Context; PISA 2012.

Resumen

Este trabajo analiza la relación entre el capital socio-cultural y el rendimiento en conocimiento financiero entre estudiantes de enseñanza secundaria obligatoria. El estudio se realiza para los 13 países de la OCDE (Organización para la Cooperación y el Desarrollo Económico) que participan en el programa específico de competencia financiera de PISA 2012. La estructura jerárquica de la encuesta PISA nos permite aproximarnos a las dimensiones socio-culturales distinguiendo entre el nivel individuo y colegio a través de la estimación de diferentes modelos multinivel. Las estimaciones nos permiten observar cómo el rendimiento académico de estos adolescentes está influenciado por el entorno familiar y escolar. Nuestros resultados indican que las familias con mayores niveles de capital cultural y de comunicación activa entre padres e hijos influyen positivamente en el rendimiento académico financiero de los adolescentes. Asimismo, si las escuelas ofrecen programas de música, teatro u otras actividades de voluntariado y competiciones de matemáticas, los resultados de los adolescentes en conocimiento financiero son mejores respecto a aquellas escuelas que no ofrecen estos programas. Un buen clima escolar, considerando la comunicación fluida entre profesor y alumno, y la participación activa de los padres en las diferentes actividades ofrecidas por la escuela mejoran dichos resultados. La investigación realizada constata que existen diferencias relevantes en el conocimiento financiero de los jóvenes según sea el capital social y cultural de sus familias y del colegio, de manera que no deberían ser considerados todos los estudiantes como un grupo homogéneo a la hora de diseñar las políticas que traten de promocionar y mejorar su competencia financiera. Aunque este estudio se centra en el conocimiento financiero, los resultados arrojan la necesidad de realizar investigaciones complementarias para analizar el rendimiento global académico de los adolescentes, considerando otros factores socio-emocionales, experiencias de aprendizajes, estructura organizativa de la escuela, etc.

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Palabras clave: Capital Social; Capital Cultural; Rendimiento Financiero; Influencia Familiar; Contexto Escolar; PISA 2012.

Introduction

Education policies in OECD countries (OECD, 2013) are taking increasing account of the determinants of adolescents' educational achievement. Using large-scale assessment surveys (e.g. TIMSS – Trends in International Mathematics and Science Study; PIRLS – Progress in International Reading Literacy Study), scholastic achievement has been analysed as an indicator of individual school's performance in relation to the factors contributing to successful performance in terms of policies, resources and practices (OECD, 2012; Sulis and Porcu, 2015), or ways to improve quality of teaching and learning (Reeve and Jang, 2006), or as a predictor of pupils' educational attainment, dropout rates and labour market transition success (Berlin, Furstenberg and Waters, 2010; Mahatmya and Lohman, 2012).

Other studies have examined the relationship between adolescents' socio-cultural background, their school's environmental attributes, and their academic achievement. Regardless of the precise nature of this relationship, some studies take account of the influence of parents' involvement in children's education based on family social capital (Coleman, 1988) or family socio-economic status (SES) (Jeynes, 2005), school social capital as a prominent source of adolescents' socialization (Crosnoe, 2004), or the cultural resources available in the home (Bourdieu and Passeron, 1977). However, the findings on the importance of the socio-cultural components of parental resources (e.g. parent-child communication) for children's school success are inconsistent.

In attempt to provide further insights into the influence of adolescents' socio-cultural background on their academic achievement, the present study investigates the effects of the attributes of the family and school environments on adolescents' educational achievement. Previous studies have considered adolescents' educational achievement in Mathematics,

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Reading and Science as a response variable related to different social (Woessmann, 2003 using TIMSS; Fuchs and Woessmann, 2007) and cultural (Barone 2006; Tramonte and Willms, 2010; Xu and Hampden-Thompson, 2012; Gran Andersen and Meier Jæger, 2013) predictors; however, the prevailing economic conditions since the onset of the international financial crisis in 2008, are highlighting the importance of adolescents' financial literacy (Samy, Tawfik, Huang, and Nagar, 2008; Lusardi, Mitchell and Curto, 2010; OECD 2013; Marfil, Gutiérrez and Marcos, 2015).

The present study contributes to the literature by using data from the 2012 Programme for International Student Assessment (PISA) to explore the effects of social and cultural capital on adolescents' financial literacy, particularly for 15-year-old secondary school pupils regardless of the grade in which they are enrolled (OECD, 2014). PISA 2012 defines financial literacy as the process enabling students to improve their understanding of financial products, concepts and contexts, to develop the skills to enable awareness of financial risks and opportunities, to make informed choices, and to take action to solve their financial problems, improve their financial wealth, and understand and become more involved in economic issues (OECD, 2013).

PISA treats financial scores as a multivariate outcome measured at student level with students nested within schools. Thus, use of a multilevel model will further provide insights into how the relationship between adolescents' outcomes in financial literacy and socio-cultural capital, differs within and between schools. Finally, the inclusion of students' family-related determinants and school environment helps to justify the investments (i.e. time and money) in social and cultural activities made by families and schools.

Our results provide compelling evidence that families with high levels of cultural capital and parents who encourage discussion of social issues have a clear positive influence on adolescents' financial literacy. Moreover, differences in adolescents' financial literacy scores are due mainly to differences between rather than within schools, and that social capital associated with school-level measures has a greater positive impact than cultural capital.

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Theoretical Framework

Our theoretical framework to understand and explain the influence of family and school characteristics on adolescents' academic achievement is based on socio-cultural capital theory (Bourdieu, 1986; Coleman, 1988) and 'ecological' human development theory (Bronfenbrenner, 1979) which together highlight the effect of the social and cultural environment on human development. Bronfenbrenner (1979) points out that the multiple social systems in which young people participate have an 'ecological' relation to each other. Socio cultural capital theory contributes by specifying how individuals interact with and contribute to their wider social world.

With this paper, we try to extend the literature that identifies supportive environments and social relationships as positive influences on youth development (Tramonte and Willms, 2010; Mahatmya and Lohman, 2012; Gran Andersen and Meier Jæger, 2013) regarding that: (i) the levels of parental and community resources may influence neonatal health and abilities at birth; (ii) developments at home may lead to changes in student behaviour; (iii) and changes in community demographics and resources may directly or indirectly lead to changes in the school environment. In this context, high academic achievement is most likely when schools, homes and communities contribute to students' abilities, willingness, and opportunities to invest in education. On the contrary, academic failure is most likely if the student has few or no sources of encouragement, practical support, and education opportunities. The influences of the various predictors are explored in depth in the succeeding sections.

Family Social and Cultural Capital during Adolescence

Academic performance has been studied with a focus on the investment in education made by students and their families, and the benefits derived from such investment (Hanushek and Woessmann, 2011). Analysis of the determinants of academic performance demonstrates how the student's socio-economic background (measured mainly by parents' level of income and education) influences eventual educational achievement (Coleman, 1988).

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There is another set of studies that analyses the relationship between academic performance and the socio-cultural components of parental resources (De Graaf, De Graaf, and Kraaykamp, 2000). Some explore the influence of social capital predictors on academic performance, based on a conceptualization of the family as the central location for generating social capital, that is, as a proxy for communication between parents and their children. The type of social capital that exists in families can be defined as bonding social capital – social relationships and resources cultivated by close relationships among people with similar background (Coleman, 1988; Mahatmya and Lohman, 2012). There is a body of research showing that in families with high economic, human and cultural capital, parent-child communication and discussion, parental encouragement to achieve academic success, and related forms of parental involvement are very effective drivers of children's academic achievement (Dika and Singh, 2002; Crosnoe, 2004; Park, 2008). However, there is a contrasting group of studies that find no differential influence of family SES and also find that the effectiveness of parental involvement is greater among low SES families compared to higher status families (Jeynes, 2005).

Drawing on Bourdieu's cultural capital reproduction theory (Bourdieu and Passeron, 1977; Bourdieu, 1986), there is a group of studies that analyses the relationships among cultural capital predictors of academic performance. It has been suggested that parents with high SES endow their children with the attitudes, knowledge, personality and skills that allow them to interact more easily and in a more familiar way with education institutions, thereby increasing their offsprings' chances of academic success (Xu and Hampden-Thompson, 2012). They find that low SES parents do not encourage or support their children's academic success not because they consider the payoff to be too small, but because they lack the skills, habits and knowledge needed to provide effective assistance (Tramonte and Willms, 2010). Therefore, several studies show that families endowed with high levels of cultural capital have a comparative advantage which helps their privileged socioeconomic position (DiMaggio, 1982; Gran Andersen and Meier Jæger, 2013).

In the present study, family social and cultural capital is represented by the parent-child bond, the cultural resources available in the home, and shared intellectual activities and family cohesion. There is some evidence that, developmentally, the parent-child relationship takes on a

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curvilinear trend during adolescence (Mahatmya and Lohman, 2012). This trend is a reflection of the individualization process that many young people experience as a part of adolescence, and should be considered when analysing longitudinal influences. While we are able only to look at the changes that occurred within a span of one year, the changes to family social and cultural capital remain important.

School Social and Cultural Capital during Adolescence

Next to the family, the school environment is a major influence on the development of adolescents. The literature suggests that the school environment is one of the most prominent sources of extra-familial relationships and socialization, and benefits the development of new social and cultural competencies (Crosnoe, 2004; Cavanagh and Fomby, 2012). The type of social capital cultivated in schools can be described as bridging capital as opposed to the bonding capital related to families. Bridging social capital emphasizes the relationships that enable contacts with diverse groups (Mahatmya and Lohman, 2012). Coleman (1988), Willis (1991) and Ostroff (2012) point to the clear influence of students' interactions with their peers on their performance. This is especially pronounced during adolescence when young people are experimenting with identities and creating social reference groups, and when the level of student engagement (which often includes a sense of social connectedness to the school environment) is likely to decline with the transition to secondary school (Edgerton, Lance, Tracey, 2013).

Research on cultural capital suggests that individuals possess different amounts of cultural capital with explains why some students meet schools' standards, are accepted by their peers, and achieve good education results, while others do not (Rumberger and Palardy, 2005; Tramonte and Willms, 2010). Since school acts as hub for the social networks deriving from the relationships among students, teachers, the school principal, and the school's ancillary staff (Goddard, 2003; Fuchs and Woessmann, 2007; Freeman, Machin, Viaregon, 2011; Hanushek and Woessmann, 2011; Edgerton et al., 2013; Sulis and Porcu, 2015), the empirical evidence shows a strong positive association between the family and school environments. Children from high SES families are already familiar with social arrangements and do not perceive school or a change

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to a different school as intimidating. Their ongoing experience at home helps them to adapt to the new school and continue to pursue academic success (DiMaggio, 1982; Jeynes, 2005; Tramonte and Willms, 2010). Elements of their family life, especially cultural resources, represent capital that can be invested to align students' expectations with the school's norms, and resolve any problems related to social acceptability. As already mentioned in relation to family socio-cultural capital, in this study we look at the changes in school social and cultural capital during adolescence that occurred within a span of one year.

Methods

Data and Sample

We use the PISA 2012 dataset to evaluate the financial literacy of 15 year-old students in 13 OECD countries: the United States, Poland, New Zealand, Estonia, Slovakia, Czech Republic, France, Australia, Israel, Belgium, Spain, Slovenia and Italy.

PISA data are derived from a comprehensive test of financial literacy involving 29,041 students nested in 5,260 schools in 18 countries (we limit our study to OECD countries). PISA data are derived from a set of two questionnaires: (i) a student background questionnaire covering family structure, parents' education and occupation, habits and attitudes of students, students' relationships with their parents, peers, teachers, and so on; and (ii) a school questionnaire aimed at school administrators covering the structure and organization of the school, school climate, proportion of parents participating in school-related activities, school infrastructure and management (OECD, 2012).

The hierarchical structure of the PISA data will allows us to study and provide further evidence on the impact of socio-cultural capital on students' financial literacy through both the home and school channels.

Based on the student questionnaire, we constructed measures for components of family background related to economic, human, cultural and social capital; based on the school questionnaire, we constructed measures of cultural and social capital taking account of the hierarchical structure of these data with pupils nested within schools. The variables used in the analyses are described below.

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Dependent Variable: Financial Literacy in PISA

Financial literacy, based on the basic knowledge areas in PISA of mathematics, reading, science and problem solving, is assessed using a tool designed to provide valid, reliable and interpretable data. Financial literacy is measured on a scale with a mean of 500 points and standard deviation of 100, based on country inclusion in the PISA 2012 study. Each financial literacy test question is associated with a particular point on the PISA financial literacy scores, which indicate its difficulty, and each student's performance is associated with a particular point on the same scale, indicating his/her estimated literacy. Given the length of the questionnaire/assessment, each student is given a sample of the items in the full test, and assigned five plausible values as the entire test had been completed (for more details see OECD 2012). We use these five plausible values as the dependent variable for our analysis (see Table I).

TABLE I. Mean Financial Literacy Scores by Country

Country	Mean Score	Rank 13-OECD Countries
United States	492	7
Poland	510	6
New Zealand	520	4
Estonia	529	2
Slovak Republic	470	12
Czech Republic	513	5
France	486	8
Australia	526	3
Israel	476	11
Belgium	541	1
Spain	484	10
Slovenia	485	9
Italy	466	13
TOTAL 13-OECD countries	*492*	--

Source: Own elaboration from PISA 2012.

Independent Variables: Social and Cultural Capital

To select the (independent) explanatory variables associated with social and cultural capital, we rely primarily on the work of Gran Andersen and

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Meier Jæger (2013) and Tramonte and Willms (2010). Gran Andersen and Meier Jæger consider that cultural capital can be analysed by observing four groups of associated variables: (i) cultural possessions at home such as classical music, books of poetry and artworks; (ii) student's reading habits, for example, reading on their own initiative, as a hobby, reading because they are forced to, reading to obtain information, etc.; (iii) cultural communication or how often the student communicates with parents (or tutors) and discusses political or social issues, books, movies, TV shows, etc.; and (iv) educational resources available in the home, such as dictionaries, a quiet place to study, a desk to study at, textbooks, etc. (Gran Andersen and Meier Jæger, 2013).

Tramonte and Willms (2010), on the other hand, distinguish between two groups of variables: (i) those associated with static cultural capital including ownership of high cultural goods (artworks, musical instruments, classical music) and intellectual activities (visiting museums, going to the ballet, going to the theatre) considered as an expression of the family's SES; and (ii) those associated with relational cultural capital including cultural resources and activities represented by the relationship between parents and child in discussions of cultural, political, and social issues, and school activities, which encompasses the resources and experiences children are able to exploit socially, to interact strategically and to achieve their goals. Static cultural capital represents the choices and lifestyles only of the parents; relational cultural capital refers to how capital is passed on to and used by the child. Barone (2006) uses a similar classification for what he calls cultural assets and cultural communication.

This previous work uses standardized indexes to measures cultural and social capital; in the present study, we explore concrete household items as indicators of family cultural interests and the involvement of parents in the education of their children, associated with social capital. Also, since the hierarchical structure of the PISA data provides information at the individual student and aggregate school levels, we can distinguish between student (first level) and school (second level) variable.

At the student level, we define our cultural capital variables by considering the presence in the home of cultural assets such as presence or not (respective value 1 or 0) of literature, poetry books and artworks (see Table II). Also, given the thin line between 'relational' cultural capital and social capital (Barone, 2006; Tramonte and Willms, 2010), social capital variables are associated with relationships with parents and peers. The PISA 2012 survey on financial literacy includes questions related to

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the content of social relations that combine attitudes to trust with reciprocity and cooperative behaviours related to items in the area of mathematics rather than financial literacy. Given the relationship between financial and mathematical knowledge according to OECD (2013, 2014), we use the following explanatory variables: (i) student's opinion on the importance to his/her parents of studying mathematics which takes the values 1 or 0 for high or low importance; (ii) whether the student participates in maths competitions organized within and outside the school, which takes the value 1 for participation in competitions and 0 otherwise; (iii) how well the student performs in maths classes which takes the value 1 if he or she enjoys maths, and 0 otherwise (see Table II).

At the school level, cultural capital is measured in terms of whether the school offers or not (dummy variable that takes the value 1 if yes and 0 if no) drama, music, volunteering and maths competitions. We also consider social capital in relation to equivalence at the student level. Social capital is measured as a poor school climate based on student-teacher relations (1 for a poor relationship and 0 otherwise), parents' engagement with the school based on frequency of voluntary parental involvement in extra-curricular activities (measured as 0% for no participation and 100% if parents participate in all activities), and frequency of communication between parents and teachers to discuss the child's progress (where 0% means parents approach the teacher on their own initiative, and 100% if parents, on their own initiative, discuss their child's progress with the teacher) (see Table II).

Independent Variables: Economic and Human Capital

The results in the literature confirm that students whose parents are more highly educated or are qualified professionals, perform better (Cavanagh and Fomby, 2012). Based on this evidence and in order to complete the family background, mother's and father's occupations are included as independent variables, distinguishing among four ICO-08 (International Classification of Occupations) categories. We differentiate between high skilled white-collar occupations (ICO groups 1, 2 and 3) and low skilled white-collar occupations (ICO groups 4 and 5), and between high skilled blue-collar occupations (ICO groups 6 and 7) and low skilled blue-collar occupations (ICO groups 8 and 9) (for more details see OECD 2012).

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The highest level of education between both parents is also considered, based on three groups according to ISCED (International Standard Classification of Education) levels: individuals with no or only compulsory level education (ISCED 1 and 2), individuals with upper secondary education (ISCED 3 and 4), and individuals with tertiary education (ISCED 5 and 6, OECD, 2012) (see Table II).

TABLE II. Descriptive Statistics of the Explanatory Variables in PISA 2012.

	MEAN	SE	MIN.	MAX.
		STUDENT LEVEL		
Cultural Capital				
Literature books at home	0.55	0.50	0	1
Poetry books at home	0.49	0.50	0	1
Artworks at home	0.67	0.47	0	1
Social Capital				
My parents think it is important for me to study mathematics	0.91	0.28	0	1
I participate in maths competitions	0.09	0.29	0	1
Students do not enjoy working in their classes	0.24	0.43	0	1
Economic capital				
Mother's Occupation				
Skilled white collar category	0.38	0.48	0	1
Unskilled white collar category	0.31	0.46	0	1
Skilled blue collar category	0.06	0.23	0	1
Unskilled blue collar category	0.25	0.43	0	1
Father's Occupation				
Skilled white collar category	0.36	0.48	0	1
Unskilled white collar category	0.15	0.36	0	1
Skilled blue collar category	0.27	0.44	0	1
Unskilled blue collar category	0.22	0.41	0	1
Human Capital				
Parents Education Level				
Compulsory Education	0.11	0.31	0	1
Secondary Education (upper)	0.43	0.50	0	1
Tertiary Education	0.46	0.50	0	1
Student Characteristics				
Females	0.50	0.50	0	1
		SCHOOL LEVEL		
Cultural Capital				
The school offers drama or music	0.64	0.48	0	1
The school offers volunteer activities	0.77	0.42	0	1
The school offers maths competitions	0.80	0.40	0	1
Social Capital				
Poor school climate on student / teacher relationships	0.12	0.33	0	1
Parents discuss, of their own initiative, their children's progress with the teacher (%)	33.03	28.36	0	100
Parents volunteer for extracurricular activities (%)	8.11	14.27	0	100
		COUNTRIES		
Effects of country dummy variables				
United States	0.05	0.22	0	1
Poland	0.05	0.21	0	1
New Zealand	0.04	0.20	0	1
Estonia	0.05	0.21	0	1
Slovak Republic	0.05	0.21	0	1
Czech Republic	0.05	0.23	0	1
France	0.05	0.21	0	1
Australia	0.15	0.35	0	1
Israel	0.04	0.21	0	1
Belgium	0.05	0.22	0	1
Spain	0.05	0.22	0	1
Slovenia	0.06	0.23	0	1
Italy	0.31	0.46	0	1

Source: Own elaboration from PISA 2012.

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Statistical Model

The layered structure of the PISA 2012 data requires consideration of the following aspects: (i) each student is assigned five plausible values to assess financial literacy; (ii) the sample is designed in two-stages: first, schools are selected, then students are selected randomly, and the cluster effect of students belonging to the same school is weighed (for more details see OECD 2012); (iii) the data are structured hierarchically, students (first level), schools (second level), and countries (third level), which requires a hierarchical linear model (Raudenbush and Bryk, 2002). Then, we estimate lineal mixed models using the STATA v13 program running the adapted '*xtmixed*' command to subroutine '*pv*', which performs estimation with plausible values.

To take account of the nested nature of the PISA 2012 database, we address the effect of cultural and social capital on the financial literacy performance of young people () by applying a multilevel lineal model (Goldstein, 1995). Our estimation strategy is defined by equation (1):

$$Y_{ijk} = \beta_0 + \beta_1 \chi_{1ijk} + \beta_2 \chi_{2ijk} + \gamma Z_{jk} + \beta_3 D_k + \mu_{0j} + \mu_{1j}\chi_{2ijk} + \varepsilon_{1ijk} \quad (1)$$

where subscripts denote: (i) student, (j) school and (k) country. So that χ_{1ijk} is the set of variables associated with the student's characteristics and the family background; χ_{2ijk} is a set of variables that describes the family´s cultural and social capital Z_{jk} is a set of variables that describes the school´s cultural and social capital; and D_k is a set of dummy variables that identifices the student´s country of residence. We denote μ_{0j} a ranmon intercept for each school, μ_{1j} as the random slope for each school of some family cultural and social capital variables, and ε_{1ijk} as an error term for student. We assume that μ_{0j}, μ_{1j} and ε_{1ijk} follow a normal distribution with a mean of zero and respective variance of σ^2_{0u}, σ^2_{1u} and σ^2_e.

The multinivel model can be interpreted by analysing its fixed and random parts. The fixed part of the model ($\beta_0 + \beta_1 \chi_{1ijk} + \beta_2 \chi_{2ijk} + \gamma Z_{jk} + \beta_3 D_k$) speifies the relationship between student achievement and a set of student or school covariates for which the slopes defined by the parameters β_1, β_2 and γ; will be estimated in the regression. We assume a fixed effect on country with the slope defined by β_3 to be estimated. The random part of the model ($\mu_{0j} + \mu_{1j}\chi_{2ijk} + \varepsilon_{1ijk}$), for which we estimate

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the variances σ^2_{0u}, σ^2_{1u} and σ^2_e, in addition to the random student level error term $[(\varepsilon)_{ijk}]$, reflects the possibility that each school has its own intercept $[(\beta]_0 + \mu_{0j})$ and its own slope $(\beta_2 + \mu_{1j})$, (for some student and family cultural and social variables. That is, the model demonstrates whether the effects of some cultural and social variables for financial literacy (after controlling for other variables in the model), in addition to school covariates (γZ_{ijk}) vary between schools. Note that this specification allows us to analyse the potential heterogeneity of certain effects between schools, and within schools (between students at the same school), in addition to the single 'average' effect for each variable.

We exploit hierarchical modelling since the model can be manipulated to provide separate estimates of the within- and between-school slopes associated with the social and cultural variables. Note that we do not include measures of economic and human capital in the random part of our model since we are interested in estimating the effects of socio-cultural capital overall and within and between schools. Thus, our objective is not to try to maximize the explained variance, but rather to understand how the relationships between student outcomes and socio-cultural capital differ within and between schools.

Results

General results

Our empirical approach relies on four specifications providing separate estimates of the within- and between-school differences. Model I considers the effect of the cultural and social capital variables on financial literacy at the student level (excluding school-level measures). Model II shows whether students' cultural and social capital has a different effect on financial literacy depending on the school attended. We incorporate some random slopes of student's family socio-cultural variables (those that were statistically significant in Model I) which allow us to observe the variation between schools (note that, in this model, the effect of school is analysed through the slopes, but does not include school-level measures). Model III shows the effects of the cultural and social capital variables on financial literacy considering both student- and school-level measures, which allows us to analyse the potential heterogeneity in

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student outcomes due to school context (Aslam and Corrado, 2012). Model IV includes both cultural and social student- and school-level measures and some random slopes of student's family socio-cultural variables, in an attempt to minimize potential heterogeneity between students' outcomes.

All the specifications include gender (a dichotomous variable with female coded 1 and male 0), parents' education level and occupation as control variables. Country dummy variables are also included to take account of possible differences among countries. Following the literature on multilevel models (Hox, 1998; Aslam and Corrado, 2012), random effects should be used only if there is a sufficient number of clusters within the data set, typically more than 30, otherwise between-group variance will be poorly estimated. Since our study considers only 13 OECD countries, the characteristics of our data dictate the type of model we can run. We chose to include country-level as a fixed rather than a random effect, such that country effects are estimated using dummy variables. Table III provides the results for the four specifications of our multilevel models.

Overall, the four specifications confirm that the higher the parents' level of education and professional qualifications, the better the student's financial literacy performance. This result is in line with studies that apply academic performance models, such as Hanushek and Woessmann (2011) for mathematical competencies in PISA 2003. The results also confirm the existence of gender differences in financial performance in favour of male students, suggesting women are less knowledgeable than men about finance, which is in line with Chen and Volpe (2002). It is in line also with studies that analyse gender differences in academic achievement in mathematics and reading and find male participants do better (e.g. Guiso, Monte, Sapienza and Zingales (2008) for PISA 2003, and Fryer and Levitt (2010) for TIMSS 2003 and PISA 2003).

Effects of family's socio-cultural capital on financial literacy scores

Regarding the cultural capital variables, our findings show that the family's cultural assets, such as literature and poetry books or artworks, are linked to the child's better financial literacy performance. This result is in line with the analysis of PISA 2000 reading competencies for 28

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OECD countries in Tramonte and Willms (2010). Gran Andersen and Meier Jæger (2013) obtain a similar result for PISA 2000 reading literacy for six OECD countries. Although these authors differentiate between high and low SES families, they find that children generally benefit from the family's cultural assets.

Variables associated with the social capital of students, such as whether parents feel it is important to study maths, or whether the students participate in maths competitions, or enjoy their maths classes, consistently show a positive relationship between the student's social capital and his or her financial literacy performance. These results confirm that, on the one hand, parents' expectations about the importance of education are an essential motivation for children, as pointed out by Coleman (1988), Willis (1991), Dika and Singh (2002), and Ostroff (2012), and on the other hand, that student's interactions with their peers clearly influence their performance (Bourdieu, 1986; Edgerton et al., 2013; Morris, 2015).

Effects of school's socio-cultural capital on financial literacy scores

Table III shows that the results for the four models support the hypothesis that there are differences among schools since, in all cases, the standard deviation logarithm of the intercept disturbance for the analyses is significant. In Model I, the estimated variance due to differences among schools is 1,874.42, which decreases in the subsequent Models II, III and IV. This means that when we consider the random slopes for some family cultural and social capital variables (e.g. Model II), and also include school-level cultural and capital measures (e.g. Model IV), the results indicate that differences among schools are reflected mainly by the school context (Kandori, 1992; Manski, 1993; Lee, 2007). The last row in Table III shows that the variation in financial scores attributed to differences between schools, goes from 0.283 in Model I to 0.581 in Model IV, that is, it is between 25% and 59%. This finding would seem to argue the importance of considering local conditions and school community relations as factors influencing students' academic performance (Cohen-Vogel, Goldring, Smrekar, 2010).

In addition, the results for the random parameters in Models II and IV indicate that the effect on students' financial performance of a change in

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family cultural assets such as books, and participation in some social relations such as maths competitions, or combining attitudes of trust with reciprocity and cooperative behaviours such as enjoying maths classes, differs from school to school. The findings seem to confirm that it is social rather than cultural capital that contributes most to these differences in student outcomes.

These results are corroborated by the findings for school level cultural capital variables in Models III and IV. We observe a positive association of these variables with student performance in financial literacy. Thus, the fact that a school offers music, drama, volunteering or maths competitions is associated with better financial literacy results compared to students who attend schools where no such cultural activities are available. This result is in line with Woessmann's (2003) findings using TIMSS data for 29 countries.

In relation to the school's social capital, the results indicate a positive relationship between social capital and students' financial performance. Thus, the existence of a good school environment based on good student-teacher relationships promotes better financial performance and helps to create a 'culture of success' in the school (Rumberger and Palardy, 2005). The results confirm also that parental involvement in the form of monitoring the child's education progress by interacting with school advisors, positively affects the child's financial performance. This is confirmed by Zick, Bryant and Österbacka (2001) and Gran Andersen and Meier Jæger (2013), although there are other empirical studies show that the impact on educational outcomes decreases as the child gets older and becomes more independent (Muller, 1998; Jeynes, 2005).

TABLE III. Estimation Yields of Multilevel Models

	Model I Coef.	Model II Coef.	Model III Coef.	Model IV Coef.
	STUDENT LEVEL			
Cultural Capital				
Literature books at home	25.814***	25.090***	24.499***	23.938***
	(2.550)	(2.554)	(2.795)	(2.798)
Poetry books at home	4.526*	4.974**	4.357***	4.682*
	(2.580)	(2.545)	(2.802)	(2.781)
Artworks at home	3.960*	4.173*	4,696 *	4.850*
	(2.393)	(2.377)	(2.556)	(2.535)
Social Capital				
Parents think mathematics is important	16.392***	16.168***	18.359***	18.498***
	(3.491)	(3.468)	(3.797)	(3.769)
I participate in maths competitions	7.653**	8.422**	8.717***	9.639**
	(3.490)	(4.194)	(3.682)	(4.520)
Students do not enjoy in their classes	-19.972***	-18.956***	-18.917***	-18.135***
	(2.450)	(2.497)	(2.688)	(2.732)
Economic capital				
Mother's Occupation				
(ref: unskilled blue collar)				
Skilled white collar category	33.000***	31.573***	31.029***	29.420***
	(2.972)	(2.938)	(3,229)	(3.191)
Unskilled white collar category	21.953***	20.756***	21.656***	20.411***
	(2.843)	(2.829)	(3.050)	(3.016)
Skilled blue collar category	9.014*	8.689*	11.038**	10.756**
	(4.772)	(4.679)	(5.248)	(5.133)
Father's Occupation				
(ref: unskilled blue collar)				
Skilled white collar category	29.128***	28.515***	28.366***	27.710***
	(3.091)	(3.069)	(3.352)	(3.327)
Unskilled white collar category	15.350***	15.122***	15.556***	15.291***
	(3.491)	(3.434)	(3.686)	(3.633)
Skilled blue collar category	9.218***	9.363***	11.604***	11.780***
	(3.099)	(3.048)	(3.418)	(3.353)
Human Capital				
Parents educational level				
(ref: compulsory education)				
Secondary Education (upper)	8.406*	9.273***	8.604**	9.425***
	(3.756)	(3.713)	(4.019)	(3.985)
Tertiary Education	11.057**	12.029***	11.569***	12.713***
	(4.104)	(4.079)	(4.390)	(4.383)
Student Characteristics				
Females	-11.557***	-11.887***	-11.346***	-11.685***
	(2.079)	(2.054)	(2.213)	(2.180)
	SCHOOL LEVEL			
Cultural Capital				
The school offers drama or music			6.269**	5.666**
			(2.910)	(2.863)
The school offers volunteer activities			6.344*	6.340*
			(3.302)	(3.246)
The school offers maths competitions			26.788***	26.507***
			(3.735)	(3.675)
Social Capital				
Poor school climate on student- teacher			-10.106***	-9.342**
			(4.176)	(4.134)
Parents discuss children's progress with the teacher (%)			0.143***	0.147***
			(0.049)	(0.049)
Parents volunteer for extracurricular activities (%)			-0.113	-0.143
			(0.093)	(0.039)

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	Model I Coef.	Model II Coef.	Model III Coef.	Model IV Coef.
		COUNTRIES		
Effects of country dummy variables[a]				
		PARAMETERS		
Intercept	432.630***	435.216***	399.759***	403.681***
	(8.036)	(7.979)	(9.485)	(9.406)
		SAMPLE		
No. of individuals	6,278	6,278	5,355	5,355
No. of schools	3,460	3,460	2,958	2,958
		RANDOM MODEL PARAMETERS		
Log of between-schools standard deviation(slope):				
Literature books		-11.295***		12.829
		(3.873)		(157.860)
Importance of maths		-9.610		-11.310
		(45.683)		(94.795)
Maths competitions		4.096***		4.122***
		(0.042)		(0.061)
Students do not enjoy in their classes		3.164***		3.153***
		(0.110)		(0.167)
Log of between-schools standard deviation	3.768***	3.739***	3.719***	3.688***
(intercept)	(0.039)	(0.022)	(0.044)	(0.031)
Log of standard deviation within-school (error	4.231***	4.188***	4.227***	4.182***
term)	(0.017)	(0.012)	(0.019)	(0.015)
		VARIANCES		
Between-schools variance (slope):				
Literature books		0.00		0.00
Importance of maths		0.00		0.00
Maths competitions		3,614.5		3,801.45
Students do not enjoy in their classes		559.67		548.24
Between–schools variance	1,874.42	1,770.50	1,698.68	1,596.23
Within-school variance	4,735.87	4,342.60	4,693.93	4,289.63
Total variance	6,610.29	6,113.10	6,391.93	10,235.55
Intra-school correlation	0.283	0.578	0.266	0.581

Source: Own elaboration from PISA 2012.

Note: Numbers in parentheses are SEs. a The effects of discrete variables of each country are not shown for reasons of space but are available from the authors on request

* P <.10.

** P <.05.

*** P <.01.

Conclusions

This paper discussed the effects of 15-year olds' social and cultural environment on their achievement in financial literacy through the channels of both family and school. We exploited data for 13 OECD countries from the 2012 PISA data set. The hierarchical structure of these data allowed us to observe two levels of policy intervention –family - a level where it is difficult to influence education policy, and school - a level where there is a greater chance of influencing public decision-makers about appropriate policies.

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Overall, our results confirm that differences in adolescents' financial literacy scores are due mainly to differences between rather than within schools, and that social capital associated with school-level measures has a greater positive impact than cultural capital.

In more detail, our results indicate that families with high cultural capital, and good communication between children and parents conducive to discussion of social issues and school activities, have a clear positive influence on the child's academic performance in financial literacy. Once students have achieved this, it is social rather than cultural capital that contributes most to these differences in students' outcomes. Therefore, young scholars should not be considered a homogeneous group by policy makers designing instruments to foster and improve children's financial literacy. Education reforms must be carefully considered. For example and following Levin's (2005) proposal, since neither all students nor all schools function in a standard way, and since education interventions do not work linearly, disadvantaged students might achieve greater success were they exposed to some of the benefits enjoyed by gifted students, including the opportunity to construct knowledge through hands-on projects and research, which is consistent with the ability of students to translate social and cultural capital in a contest context, thereby increasing performance and reducing inequalities.

At the school level, the availability of specific social and cultural variables, such as opportunities for music and drama, volunteering and maths competitions, combined with good student-teacher relationships and parents' engagement in school activities, are likely to have a positive and significant effect on the financial performance of the students attending such schools. This finding suggests the importance of the school's designing and offering socio-cultural activities. School principals (and education policy more generally) could justify the resources devoted to socio-cultural activities as mechanisms to enhance students' educational achievement as well as their enjoyment. The use of random slope models allowed us to observe students' different exploitation of their resources, especially those related to social capital, which is highly context-dependent (i.e. social capital focuses on networks, in our case, relationships between students and the norms governing these relationships at the institutional (school) and individual (family) levels) and introduces difficulties in relation to aggregating it across different

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levels (family, community, class, group, school). Our results show that participation in maths competitions, and the school climate, are important for all students, suggesting different academic progress in different school settings.

Our focus on a narrow set of cognitive variables (financial literacy) stress the need for more research to complement this work. We need to consider socio-emotional outcome variables to enable a more rounded study of adolescents including their attitudes to school and to learning; their positive or negative experiences of school organization, peers and teachers, classroom behaviour and social cohesion. In other words, we need to know about adolescent's sense of satisfaction with their school. This implies the need to develop an alternative model for analysing adolescents' academic performance.

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